10/642,935

NPC STIC
Search
History/Databases

8/17/04

17aug04 08:06:26 User259284 Session D2871.2

SYSTEM:OS - DIALOG OneSearch
File 34:SciSearch(R) Cited Ref Sci 1990-2004/Aug W2
(c) 2004 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
(c) 1998 Inst for Sci Info

Set	Items	Description
S1	1	CR='PRUESSMAN KP, 1999, V42, P956, MAGNET RESON ME'
S2	266	CR='PRUESSMANN KP, 1999, V42, P952, MAGNET RESON M':CR='PR-UESSMANN KP, 2001, V46, P638, MAGNET RESON M'
S3	267	S1:S2
S4	310	(REFERENC???? OR NAVIGAT??????)(4N)ECHO???????
S5	9	3AND4
S6	1	S5 AND PARALLEL?
S7	1	S5 AND (ARRAY????? OR MATRI???????)
S8	1	S7 NOT S6

STIC-EIC2800 JEF-4B68

17aug04 07:18:52 User259284 Session D2870.9

File 94:JICST-EPlus 1985-2004/Jul W4
(c)2004 Japan Science and Tech Corp(JST)

Set	Items	Description
S1	9	AU='IKEZAKI Y'
S2	6	AU='IKEZAKI YOSHIKAZU'
S3	34	AU=IKEZAKI Y?
S4	6	S3 AND (MRI OR NMR OR MR OR MAGNETIC()RESONANCE??)
S5	0	S4 NOT S2

17aug04 07:21:30 User259284 Session D2870.10

SYSTEM:OS - DIALOG OneSearch
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200452
File 347:JAPIO Nov 1976-2004/Apr(Updated 040802)
File 344:Chinese Patents Abs Aug 1985-2004/May

Set	Items	Description
S1	199	AU='IKEZAKI Y':AU='IKEZAKI YUZURU'
S2	53	S1 AND (MRI OR NMR OR MR OR MAGNETIC()RESONANCE?? OR IC=A6-1B?)
S3	2	S2 AND INTERMED????????
S4	52625	S4:S31
S5	622	S4 AND INTERMED???????????
S6	1920	S4 AND PARALLEL??
S7	45	5AND6
S8	11	S7 AND (ARRAY???? OR MATRI???????)
S9	3	S8 AND (SENS??? OR SENSITIV???????)
S10	1	S9 NOT S3
S11	22	S7 AND (MRI OR NMR OR IMAGING OR MAGNETIC()RESONANCE)
S12	20	S11 NOT S9
S13	0	S12 AND NAVIGAT???????
S14	0	S12 AND ECHO??????
S15	6	S12 AND APPARATUS
S16	6	S12 AND SYSTEM??
S17	1	S12 AND EQUIPMENT??
S18	0	S12 AND HARDWARE??
S19	1	S12 AND ARRANGEMENT??
S20	11	S15:S19
S21	11	S20 NOT S9

```
17aug04 07:15:13 User259284 Session D2870.8

SYSTEM:OS - DIALOG OneSearch
  File 155:MEDLINE(R) 1951-2004/Aug W3
  File   2:INSPEC 1969-2004/Aug W2
  File  73:EMBASE 1974-2004/Aug W2

Set     Items   Description
S1         48   AU='PRUESSMANN K':AU='PRUESSMANN KLAAS P' OR AU='PRUESSMAN-
              N, K.P.'
S2         23   RD S1 (unique items)
S3         20   S2 AND (SENS??? OR SENSITIV????????)
S4          7   S2 AND PARALLEL?
S5          6   3AND4
S6          7   S4:S5
S7         20   AU='IKEZAKI Y':AU='IKEZAKI Y.' OR AU='IKEZAKI, Y.'
S8         16   RD S7 (unique items)
S9          2   S8 AND PARALLEL?
S10         0   S8 AND (SENS??? OR SENSITIV????????)
```

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     17aug04 06:54:45 User259284 Session D2870.2

SYSTEM:OS  - DIALOG OneSearch
  File  34:SciSearch(R) Cited Ref Sci 1990-2004/Aug W2
         (c) 2004 Inst for Sci Info
  File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info

Set     Items   Description
S3          2   CR='PRUSSMANN KP, 1999, V42, P952, MAGNET RESON ME'
```

17aug04 06:59:56 User259284 Session D2870.6

File 342:Derwent Patents Citation Indx 1978-04/200449
(c) 2004 Thomson Derwent

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Set      Items   Description
S1          37   RF='PRUESSMAN':RF='PRUESSMANN'
S2          25   S1 AND IC=A61B?
S3           0   RF=861 AND S1
S4           1   SENSE AND S1
S5           9   SENSITIV? AND S1
S6          37   S1 AND (MRI OR NMR OR MAGNETIC()RESONANCE OR RF=(MRI OR NMR))
S7           7   S4:S5 AND S2
S8           0   S1 AND NAVIGAT????????
S9           1   S1 AND ECHO???????
S10          2   S1 AND CORRECT?????
S11          4   S1 AND PHAS???
S12          7   S1 AND RECEIV?????
S13          8   S1 AND (MATRIX???? OR MATRICES OR ARRAY????? OR SEVERAL???
               OR MULTI OR MULTIPLE OR MULTICOIL?)
S14          0   S1 AND PARALLEL????
S15          4   PARALLEL????()IMAGING????
S16        26  S4:S5 OR S7:S15 OR (S1 AND SENS?????????)
? map pn

8 Select Statement(s), 91 Search Term(s)
Serial#SD713

1 SearchSaves,  91 Search Term(s)

? b 350 347 344;ex
```

17aug04 07:05:53 User259284 Session D2870.7

SYSTEM:OS - DIALOG OneSearch
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200452
File 347:JAPIO Nov 1976-2004/Apr(Updated 040802)
File 344:Chinese Patents Abs Aug 1985-2004/May

17aug04 07:05:53 User259284 Session D2870.7

SYSTEM:OS - DIALOG OneSearch
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200452
File 347:JAPIO Nov 1976-2004/Apr(Updated 040802)
File 344:Chinese Patents Abs Aug 1985-2004/May

Set	Items	Description
S1	34	S1:S7
S2	20	S1 AND (SENS???? OR SENSITIV?????????)
S3	9	S1 AND PARALLEL?
S4	1	S1 AND PHAS???(3N)CORRECT???????
S5	0	S1 AND INTERMED?????????
S6	1	S1 AND NAVIGAT????????
S7	10	S1 AND REDUC???????
S8	2	S1 AND (FOV? ? OR VIEW?????(3N)FIELD??????)
S9	22	S1 AND RECEIV???????
S10	16	S1 AND (MATRI?????? OR ARRAY??????)
S11	20	S1 AND IC=A61B?
S12	20	S2 AND S3:S11
S13	9	2AND7
S14	14	2AND9
S15	8	2AND10
S16	14	2AND11
S17	7	7AND9
S18	5	7AND10
S19	7	7AND11
S20	15	9AND11
S21	9	10AND11
S22	8	9AND10
S23	22	S1 AND (APPARATUS?? OR EQUIPMENT OR SYSTEM??)
S24	22	S23 AND S2:S22
S25	8	2AND23AND11
S26	11	14AND16AND20
S27	6	14AND16AND20AND23
S28	14	9AND24
S29	4	9AND24AND7
S30	28	S3:S6 OR S8 OR S13 OR S15 OR S17:S19 OR S21:S22 OR S25 OR - S29
S31	17	PHASE??(3N)CORRECT????? AND (SENS???? OR SENSITIV??????)(3-N)(ARRAY???? OR MATRIC???? OR MATRIX?????)
S32	2	S31 AND IC=A61B?
S33	30	S30 OR S32

```
17aug04 08:09:33 User259284 Session D2871.3

SYSTEM:OS - DIALOG OneSearch
  File 348:EUROPEAN PATENTS 1978-2004/Aug W02
         (c) 2004 European Patent Office
  File 349:PCT FULLTEXT 1979-2002/UB=20040812,UT=20040805
         (c) 2004 WIPO/Univentio
```

Set	Items	Description
S1	572	(REFERENC???? OR NAVIGAT??????)(4N)ECHO???????
S2	6043	PARALLEL??(4N)IMAG????
S3	17	1AND2
S4	256	ECHO?????(10N)PARALLEL??
S5	13376	(REFERENC???? OR NAVIGAT??????)(10N)PARALLEL??
S6	8123	PHASE??(3N)CORRECT???????
S7	5	3AND4
S8	7	3AND5
S9	7	3AND6
S10	2	7AND8
S11	4	7AND9
S12	3	8AND9
S13	2	10AND12
S14	5	(S3 OR S7:S13) AND (REFERENC???? OR NAVIGAT?????)/TI,AB,CM
S15	4	S14 AND ECHO?????/TI,AB,CM
S16	2	S15 AND PARALLEL??/TI,AB,CM
S17	1	S16 NOT S13

3/9/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

11866825 Genuine Article#: 702UB Number of References: 20
Title: Superconducting single and phased-array probes for clinical and research MRI
Author(s): Wosik J (REPRINT) ; Xie LM; Nesteruk K; Xue L; Bankson JA; Hazle JD
Corporate Source: Univ Houston,Texas Ctr Superconduct,Houston//TX/77204 (REPRINT); Univ Houston,Texas Ctr Superconduct,Houston//TX/77204; Univ Houston,Dept Elect & Comp Engn,Houston//TX/77204; Polish Acad Sci,Inst Phys,Warsaw//Poland/; Univ Texas,MD Anderson Canc Ctr, Dept Imaging Phys,Houston//TX/77030
Journal: IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY, 2003, V13, N2,1 (JUN), P1050-1055
ISSN: 1051-8223 Publication date: 20030600
Publisher: IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC, 445 HOES LANE, PISCATAWAY, NJ 08855 USA
Language: English Document Type: ARTICLE
Geographic Location: USA; Poland
Journal Subject Category: ENGINEERING, ELECTRICAL & ELECTRONIC; PHYSICS, APPLIED

NA TAF 8/17/2004

Abstract: Significant improvement of the signal-to-noise ratio (SNR) for magnetic resonance imaging (MRI) applications, in which the thermal noise of the rf receiver probe dominates the system noise can be achieved by cooling down a normal metal probe or by using superconductors. In this work, the SNR enhancement expected from using superconductors for single coil and/or phased array designs are calculated, discussed and compared with some experimental results. We also report on the design and fabrication of a 63.8 MHz probe (1.5 Tesla) consisting of patterned, copper or YBCO films deposited on both sides on a 5 cm LaAlO3 substrate. The unloaded Q of the normal metal probe at room temperature and at 77 K was about 400 and 1000, respectively, while the YBCO probe exhibited a Q of 40 000 at 77 K. Five-cm diameter probes cooled to 71 K were superior to their identically designed room temperature equivalents, and provided SNR gains at 1.5 Tesla of 3 and 2 times for YBCO and cooled normal metal, respectively. The application of superconducting coils in conjunction with recently developed techniques for significant reduction of MRI acquisition times by using parallel processing with phased array probes is discussed.
Descriptors--Author Keywords: high temperature superconductors ; magnetic resonance imaging ; partial parallel imaging ; rf resonators
Identifiers--KeyWord Plus(R): SURFACE COIL; ACQUISITION; MICROSCOPY
Cited References:
EM TECHN INC, THEVA
BANSON ML, 1992, V10, P929, MAGN RESON IMAGING
BLACK RD, 1993, V259, P793, SCIENCE
GONORD P, 1994, V65, P509, REV SCI INSTRUM
HOULT P, 1996, V24, P71, J MAGN RESON
HURLSTON SE, 1999, V41, P1032, MAGNET RESON MED
HYDE JS, 1986, V70, P512, J MAGN RESON
JOHNSON VA, 2001, V9, P1, DEV PLANT BREED
LIANG ZP, 2000, PRINCIPLES MAGNETIC
MA QY, 1999, P 8 ISMRM SCI M PHIL
PRUSSMANN KP, 1999, V42, P952, MAGNET RESON MED
HAYES CE, 1990, V16, P181, MAGNET RESON MED

NA THF 8/17/2004

3/9/2 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

09045603 Genuine Article#: 360MG Number of References: 17
Title: Partially parallel imaging with localized sensitivities (PILS)
Author(s): Griswold MA (REPRINT) ; Jakob PM; Nittka M; Goldfarb JW; Haase A
Corporate Source: UNIV WURZBURG,DEPT PHYS/D-97074 WURZBURG//GERMANY/ (REPRINT); UNIV NIJMEGEN HOSP,DEPT RADIOL MRI/NIJMEGEN//NETHERLANDS/
Journal: MAGNETIC RESONANCE IN MEDICINE, 2000, V44, N4 (OCT), P602-609
ISSN: 0740-3194 Publication date: 20001000
Publisher: JOHN WILEY & SONS INC, 605 THIRD AVE, NEW YORK, NY 10158-0012
Language: English Document Type: ARTICLE
Geographic Location: GERMANY; NETHERLANDS
Subfile: CC LIFE--Current Contents, Life Sciences; CC CLIN--Current Contents, Clinical Medicine
Journal Subject Category: RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING
Abstract: In this study a novel partially parallel acquisition method is presented, which can be used to accelerate image acquisition using an RF coil array for spatial encoding. In this technique, Parallel Imaging with Localized Sensitivities (PILS), it is assumed that the individual coils in the array have localized sensitivity patterns, in that their sensitivity is restricted to a finite region of space. Within the PILS model, a detailed, highly accurate RF field map is not needed prior to reconstruction. In PILS, each coil in the array is fully characterized by only two parameters: the center of coil's sensitive region in the FOV and the width of the sensitive region around this center. In this study, it is demonstrated that the incorporation of these coil parameters into a localized Fourier transform allows reconstruction of full FOV images in each of the component coils from data sets acquired with a reduced number of phase encoding steps compared to conventional imaging techniques. After the introduction of the PILS technique, primary focus is given to issues related to the practical implementation of PILS, including coil parameter determination and the SNR and artifact power in the resulting images. Finally, in vivo PILS images are shown which demonstrate the utility of the technique. (C) 2000 Wiley-Liss, Inc.
Cited References:
PRUSSMANN KP, 1999, V42, P952, MAGNET RESON MED

10/642,935

8/17/04

6/9/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

12306295 Genuine Article#: 751HZ Number of References: 6
Title: Three-dimensional magnetic resonance imaging of congenital cardiac anomalies
Author(s): Razavi RS (REPRINT) ; Hill DLG; Muthurangu V; Miquel ME; Taylor AM; Kozerke S; Baker EJ
Corporate Source: Univ London Kings Coll,Div Imaging Sci, Guys Hosp, Cardiac MR Res Grp,5th Floor,Guys Tower/London SE1 9RT//England/ (REPRINT); Univ London Kings Coll,Div Imaging Sci, Guys Hosp, Cardiac MR Res Grp,London SE1 9RT//England/
Journal: CARDIOLOGY IN THE YOUNG, 2003, V13, N5 (OCT), P461-465
ISSN: 1047-9511 Publication date: 20031000
Publisher: GREENWICH MEDICAL MEDIA LTD, 137 EUSTON RD, 4TH FLOOR, LONDON NW1 2AA, ENGLAND
Language: English Document Type: ARTICLE
Geographic Location: England
Journal Subject Category: CARDIAC & CARDIOVASCULAR SYSTEMS; PEDIATRICS
Abstract: We describe a new method of three-dimensional magnetic resonance imaging of the heart that has been used to produce high quality diagnostic images in 274 patients with congenital cardiac disease, ranging in age from 1 day to 66 years. Using a steady state free precession gradient echo technique and **parallel** imaging, rapid acquisition of the entire cardiac volume is possible during 8 to 15 sequential breath-holds, each lasting between 8 and 15 s. We obtained high-resolution images, with a resolution of 1 mm(3), at between 3 and 10 phases of the cardiac cycle.

While images of diagnostic quality were obtained in all cases, in 52 patients there was some degradation due to various factors. Children under 8 years were ventilated, and ventilation was suspended for the breath-holds. For patients breathing spontaneously a novel respiratory navigator technique was developed, using a **navigator echo** placed over the right hemidiaphragm. This was used successfully in 20 patients, and reduced the misalignment of images obtained during different breath-holds.

Images were analysed using multi-planar reformatting and volume rendering. Image processing took approximately five minutes for each study. End-diastolic images were processed for all patients. Systolic images were also processed in selected cases.

Further improvements in **parallel** imaging should reduce imaging times further, so that it is possible to obtain the full volume image in a single breath-hold. This will enable imaging of complex anatomy to be obtained using a standard imaging protocol that does not require the operator to understand the cardiac malformation, making the magnetic resonance imaging of congenital cardiac disease faster and more effective.
Descriptors--Author Keywords: magnetic resonance imaging ; cardiac anomalies ; cardiology
Cited References:
ANDRIANTSIMIAVO.R, 2003, ISMRM
KOZERKE S, 2003, ISMRM
MIQUEL ME, 2003, IN PRESS INT J CARDI
PRINCE MR, 1997, 3D CONTRAST MR ANGIO
PRUESSMANN KP, 1999, V42, P952, MAGNET RESON MED

Date No Good
Priority of Applicant is
August 2002
N/A TAF 8/17/2004

STIC-EIC2800 JEF-4B68

11622698 PMID: 11796248
2D **SENSE** for faster 3D MRI.

Weiger Markus; **Pruessmann Klaas P**; Boesiger Peter
Institute for Biomedical Engineering, University of Zurich and Swiss Federal Institute of Technology Zurich, Gloriastrasse 35, CH-8092, Zurich, Switzerland.

Magma (New York, N.Y.) (Netherlands) Mar 2002, 14 (1) p10-9, ISSN 0968-5243 Journal Code: 9310752
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS

NA TAF
8/17/2004

Sensitivity encoding in two spatial dimensions (2D **SENSE**) with a receiver coil array is discussed as a means of improving the encoding efficiency of three-dimensional (3D) Fourier MRI. It is shown that in Fourier imaging with two phase encoding directions, 2D **SENSE** has key advantages over one-dimensional **parallel** imaging approaches. By exploiting two dimensions for hybrid encoding, the conditioning of the reconstruction problem can be considerably improved, resulting in superior signal-to-noise behavior. As a consequence, 2D **SENSE** permits greater scan time reduction, which particularly benefits the inherently time-consuming 3D techniques.Along with the principles of 2D **SENSE** imaging, the properties of the technique are discussed and investigated by means of simulations. Special attention is given to the role of the coil configuration, yielding practical setups with four and six coils. The in vivo feasibility of the two-dimensional approach is demonstrated for 3D head imaging, permitting four-fold scan time reduction.

Tags: Human; Support, Non-U.S. Gov't
Descriptors: *Magnetic Resonance Imaging--instrumentation--IS; *Magnetic Resonance Imaging--methods--MT; Computer Simulation; Fourier Analysis; Head --pathology--PA; Image Processing, Computer-Assisted; **Sensitivity** and Specificity; Software
Record Date Created: 20020117
Record Date Completed: 20020412

6/9/6 (Item 6 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

11438809 PMID: 11545134
Sensitivity encoded cardiac MRI.
Pruessmann K P; Weiger M; Boesiger P
Institute of Biomedical Engineering and Medical Informatics, University of Zurich and Swiss Federal Institute of Technology Zurich.
Journal of cardiovascular magnetic resonance - official journal of the Society for Cardiovascular Magnetic Resonance (United States) 2001, 3 (1) p1-9, ISSN 1097-6647 Journal Code: 9815616
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: Completed
Subfile: INDEX MEDICUS

NA TAF 8/17/2004

Imaging speed is a key factor in most cardiovascular applications of magnetic resonance imaging. Recently, simultaneous signal acquisition with multiple coils has received increasing attention as a means of enhancing scan speed in MRI. Based on this approach, the **sensitivity** encoding technique **SENSE** enables substantial scan time reduction by exploiting the inherent spatial encoding effect of receiver coil **sensitivity**. This work studies the benefit of **sensitivity** encoding for cardiovascular MRI. **SENSE** is applied to accelerate common breath-hold imaging as well as real-time imaging by factors up to 3.2. In the breath-hold mode with ECG triggering, this speed benefit has been used both for reducing the breath-hold interval and for improving spatial resolution. In cardiac real-time imaging without triggering and breath control, the **SENSE** approach has enabled significantly enhanced temporal resolution, ranging down to 13 ms (77 frames/s). Cardiac real-time **SENSE** is demonstrated in several modes, including real-time imaging of three **parallel** slices at a rate of 25 triple frames per second.

Tags: Human
Descriptors: *Electrocardiography--instrumentation--IS; *Heart--anatomy and histology--AH; *Image Enhancement--instrumentation--IS; *Image Processing, Computer-Assisted--instrumentation--IS; *Magnetic Resonance Imaging--instrumentation--IS; Feasibility Studies; Fourier Analysis; Reference Values; **Sensitivity** and Specificity; Time and Motion Studies
Record Date Created: 20010906
Record Date Completed: 20010927

13/3,K/2   (Item 2 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00802236
A magnetic resonance imaging method and apparatus
PATENT ASSIGNEE:
Marconi Medical Systems, Inc., (2915231), 595 Miner Road, Highland Heights, Ohio 44143, (US), (Proprietor designated states: all)
INVENTOR:
Gullapalli, Rao P., 345 Branford Lane, Richmond Heights, Cuyahoga, Ohio

NA TAF 8/17/2004

NO Parallel Receivers
No Navigator echoes

PATENT (CC, No, Kind, Date): EP 745865 A1 961204 (Basic)
EP 745865 B1 020807
APPLICATION (CC, No, Date): EP 96303300 960513;
PRIORITY (CC, No, Date): US 459051 950602

...ABSTRACT sub(+1)), s(sub(-1))). A phase map is generated (90) from the spin and gradient echo images. One of the gradient echo images is **corrected** (116) with the **phase** map. The **phase corrected** gradient image is additively combined (118) with the spin echo image to generate a first species image (112) and is subtractively combined (120) to generate...

...SPECIFICATION msec. displaced echoes substantially cancel. Another drawback of the Glover technique is that three repetitions of the imaging sequence are required to generate magnetic resonance **echoes** with retarded, advanced, and **reference** timings.

In accordance with one aspect of the present invention, a magnetic resonance imaging method is provided. A resonance excitation pulse and a resonance refocusing...3) reconstructs magnetic resonance signals from the second gradient echo into a second gradient echo image.

One advantage of the present invention is that the **reference**, advanced, and retarded resonance **echo** signals are collected in a single acquisition.

Another advantage of the present invention is that data acquisition is accelerated.

Another advantage of the present invention...whole body RF coil 26 or the localized coil 34 and conveyed to the digital receiver 38. A sorter 84 sorts the signals from the **reference**, retarded, and advanced **echoes**. A reconstruction processor 86, preferably three **parallel** processors, reconstructs a **reference image** s(sub(0)), a first, retarded image s(sub(-1)), and a second, advanced image s(sub(+1)).

The images are defined by: (Formula omitted...

...is fit to a polynomial, it is defined by: (Formula omitted) The background phase e(sup((phi)fit) for each pixel is stored in a **phase correction** or background **phase** memory 100.

A **corrected** image generator 110 combines the **phase correction** and the uncorrected reconstructed images to generate **phase corrected** water and fat images which are stored in a water image memory 112 and a fat image memory 114. In the preferred embodiment, the water...

...defined by: (Formula omitted) (Formula omitted) More specifically, a multiplier 116 multiplies one of the s(sub(-1)) and s(sub(+1)) images with the **phase correction** from the background **phase** memory 100. An image adder 118 adds the complex **phase corrected** gradient echo image with the complex spin echo image to generate the water image (Equation (5a)). A subtraction circuit 120 subtractively combines the complex **phase corrected** gradient echo with the complex spin echo image to generate the fat image (Equation (5b)). Optionally, a weighting adjustment 122 is provided for multiplying the...

...omega)' is the frequency difference between the first and third species and n is an integer, preferably 1 or an odd number. The above-described **phase correction** process is repeated to

generate a **phase correction** between the first and second species and another **phase correction** between the first and third species. The sum of the complex gradient echo image that is adjacent to the spin echo and the complex spin...

...SPECIFICATION msec. displaced echoes substantially cancel. Another drawback of the Glover technique is that three repetitions of the imaging sequence are required to generate magnetic resonance **echoes** with retarded, advanced, and **reference** timings.

In accordance with one aspect, the present invention provides a magnetic resonance imaging method in which a resonance excitation pulse and a resonance refocusing...3) reconstructing magnetic resonance signals from the second gradient echo into a second gradient echo image.

One advantage of the present invention is that the **reference**, advanced, and retarded resonance **echo** signals are collected in a single acquisition.

Another advantage of the present invention is that data acquisition is accelerated.

Another advantage of the present invention...whole body RF coil 26 or the localized coil 34 and conveyed to the digital receiver 38. A sorter 84 sorts the signals from the **reference**, retarded, and advanced **echoes**. A reconstruction processor 86, preferably three **parallel** processors, reconstructs a **reference image** s0)), a first, retarded image s-1)), and a second, advanced image s+1)). The images are defined by: where (rho)W)) and (rho)F...

...the background phase is fit to a polynomial, it is defined by: The background phase e(phi)fit) for each pixel is stored in a **phase correction** or background **phase** memory 100.

A **corrected** image generator 110 combines the **phase correction** and the uncorrected reconstructed images to generate **phase corrected** water and fat images which are stored in a water image memory 112 and a fat image memory 114. In the preferred embodiment, the water and fat images are defined by: More specifically, a multiplier 116 multiplies one of the s-1)) and s+1)) images with the **phase correction** from the background **phase** memory 100. An image adder 118 adds the complex **phase corrected** gradient echo image with the complex spin echo image to generate the water image (Equation (5a)). A subtraction circuit 120 subtractively combines the complex **phase corrected** gradient echo with the complex spin echo image to generate the fat image (Equation (5b)). Optionally, a weighting adjustment 122 is provided for multiplying the...

...omega)' is the frequency difference between the first and third species and n is an integer, preferably 1 or an odd number. The above-described **phase correction** process is repeated to generate a **phase correction** between the first and second species and another **phase correction** between the first and third species. The sum of the complex gradient echo image that is adjacent to the spin echo and the complex spin...

...CLAIMS imaging sequence;

generating first and second gradient echo images from the gradient echo signals of the plurality of repetitions of the imaging sequence;

generating a **phase correction** map from the spin echo image and the first and second gradient echo images;

correcting phase error in the first gradient echo image in accordance with the phase map;

additively combining the spin echo image with the **phase corrected** first gradient echo image to generate a first species image (112); and

subtractively combining the spin echo image with the **phase corrected** first gradient echo image to generate a second species image (114).

3. A method as claimed in claim 2, further including:

generating the first gradient...

...second gradient echo image.

9. A magnetic resonance imaging apparatus as claimed in claim 8, further including:
   a phase map generator (90) which generates a **phase correction** map from the spin echo image and the first and second gradient echo images;
   a circuit (110, 116) which corrects one of the gradient echo images with the phase map to generate a **phase** map **corrected** gradient echo image;
   an image adder (118) which adds the spin echo and the **phase corrected** gradient echo images to generate a first species dipole image (112);
   an image subtractor (120) which subtractively combines the spin echo and the **phase corrected** gradient echo images to generate a second species dipole image (114). ...

...CLAIMS imaging sequence;
generating first and second gradient echo images from the gradient echo signals of the plurality of repetitions of the imaging sequence;
generating a **phase correction** map from the spin echo image and the first and second gradient echo images;
correcting phase error in the first gradient echo image in accordance with the phase map;
additively combining the spin echo image with the **phase corrected** first gradient echo image to generate a first species image (112); and
subtractively combining the spin echo image with the **phase corrected** first gradient echo image to generate a second species image (114).
3. A method as claimed in claim 2, further including:
generating the first gradient...

...second gradient echo image.

9. A magnetic resonance imaging apparatus as claimed in claim 8, further including:
   a phase map generator (90) which generates a **phase correction** map from the spin echo image and the first and second gradient echo images;
   a circuit (110, 116) which corrects one of the gradient echo images with the phase map to generate a **phase** map **corrected** gradient echo image;
   an image adder (118) which adds the spin echo and the **phase corrected** gradient echo images to generate a first species dipole image (112);
   an image subtractor (120) which subtractively combines the spin echo and the **phase corrected** gradient echo images to generate a second species dipole image (114).

...CLAIMS echo de gradient a partir des signaux d'echo de gradient de la pluralite de repetitions de la sequence d'imagerie,
generer une carte de **correction** de **phase** a partir de l'image en spin-echo et des premiere et seconde images en echo de gradient,
corriger une erreur de phase dans la...

...Dispositif d'imagerie par resonance magnetique selon la revendication 8, comportant de plus :
un generateur de carte de phase (90) qui genere une carte de **correction** de **phase** a partir de l'image en spin-echo et des premiere et deuxieme images en echo de gradient,
un circuit (110, 116) qui corrige une...

17/3,AB,K/1 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01014827

Use of navigator echoes for the correction of motion artifacts in MRI

Does not accant for Senstivity of Plural Recem in parallel
TAF 8/17/2004

PATENT ASSIGNEE:
Hitachi Medical Corporation, (453493), 1-14, Uchikanda-1-chome, Chiyoda-ku, Tokyo 101-0047, (JP), (Applicant designated States: all)
INVENTOR:
Takizawa, Masahiro, 201 Hakuseiryo, 1-17 Kooda, Kashiwa-shi, Chiba
PATENT (CC, No, Kind, Date): EP 909958 A2 990421 (Basic)
EP 909958 A3 000329
APPLICATION (CC, No, Date): EP 98116655 980903;
PRIORITY (CC, No, Date): JP 97284945 971017
DESIGNATED STATES: DE; FR; GB; NL
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: G01R-033/561

ABSTRACT EP 909958 A2
In a magnetic resonance imaging method in which after irradiating RF pulses (201, 2011, 2012) of magnetic resonance frequencies into an object to be inspected, a sequence of detecting echo signals (207) sequentially and a step of reconstructing an image by making use of the obtained echo signals (207) are repeated in parallel, and an animating image is obtained by successively renewing a part of the echo signals (207) used for reconstructing the previous image, a navigator echo (3021, 3022) is generated for every irradiation of the RF pulses (201, 2011, 2012) and is detected, a navigator echo which is served as a reference for correcting phases of the echo signals (207) used for the image reconstruction is successively renewed for every image, and the phases of the echo signals (207) are corrected based on the renewed navigator echo (3021, 3022) for every image to obtain the same. Thereby, a reference time for correcting object motion by making use of navigator echoes (3021, 3022) is set short and artifacts due to an object motion is reduced with an accuracy corresponding to a high temporal resolution. Thus, an MRI method which permits reduction of artifacts due to object motions while keeping a high temporal resolution for an MRI of animating images is provided.
ABSTRACT WORD COUNT: 213
NOTE:
Figure number on first page: 6

...SPECIFICATION 8.
In this instance, pieces of image 5011 (equivalent to) 5017 are renewed for every repetition time TR of the unit measurement 304. However, the **navigator echo** used as a **reference** is renewed for every four unit measurements counting from the first unit measurement 304 (the renewal timings A, B and C are illustrated in gray in the drawing), therefore, a reference interval for the object motion correction making use of such **navigator echo** is prolonged to four times of the repetition time (4TR), and thus, notwithstanding a high apparent temporal resolution corresponding to the image renewal interval TR...

...an object to be inspected, a sequence of detecting echo signals sequentially and a step of reconstructing an image by making use of the obtained **echo** signals are repeated in **parallel**, and subsequent **images** are obtained by successively renewing a part of the echo signals used for reconstructing the previous image, the MRI method and the device therefor according to the present invention is characterized in that, a **navigator echo** is generated for every irradiation of the RF pulses and is detected, a **navigator echo** which is served as a reference for **correcting phases** of the echo signals used for the image reconstruction is successively renewed for every image, and the phases of the echo signals are corrected based on the renewed **navigator echo** for every image to obtain the same.

Through the successive renewal of the **reference navigator echo**, the **reference** interval ...RF pulses, namely, a multi-shot sequence, and can reduce artifacts due to object motion caused between shots.

In the present invention, at least one **navigator echo** having zero phase encoding amount is desirably generated additionally for every RF pulse. For the object motion **correction, phase** differences between a **reference navigator echo** and other **navigator echoes** generated and obtained in connection with respective RF pulses are used for **correcting phases** of the obtained echo signals, thereby artifacts due to object motion are substantially removed.

Further, the **navigator echo** is primarily introduced to monitor motions of an object to be inspected with respect to an axis of the **navigator echo**, therefore, if another **navigator echo** having different axis is obtained, the object motion in plural directions can be monitored.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a view for...

...as well as conventional MRI methods ;

Fig.5 is a view for explaining a conventional MR fluoroscopy ;

Fig.6 is a view for explaining a **navigation echo** method which is applied to the MRI methods according to the present invention as well as conventional MRI methods ;

Fig.7 is a view for explaining a conventional **navigation echo** method ; and,

Fig.8 is a view for explaining an example of conceivable MRI methods when an MR fluoroscopy and a **navigation echo** method are simply combined.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Hereinbelow, the MRI method and the device therefor according to the present invention are explained with...are caused in the animated images thus obtained. Therefore, in the imaging method according to the present invention, a step is introduced in which a **navigator echo** is generated and detected in every measurement 1011 (equivalent to) 1014 corresponding to respective shots of RF pulses, and with these **navigator echo**, phases of **echo** signals in respective echo trains are corrected which are used for reconstructing respective images.

The pulse sequence including **navigator echoes** is prepared by adding a sequence of generating **navigator echoes** to a multi-shot sequence, in that as illustrated in Fig.6, at first an RF pulse 2011 is irradiated at the same time with the application of a slicing gradient magnetic field Gs 202, subsequently, a gradient magnetic field Gr 301 for generating a **navigator echo** is applied. When the positive and negative application amount of the gradient magnetic field 301 is made equal, a **navigator echo** 3021 is generated which is sampled during time span 303 to obtain data expanding along time axis. The phase encoding amount of the **navigator echo** is zero, because no phase encoding gradient magnetic field is applied thereto.

Portions 2111 and 2112 in Fig.6 surrounded by solid lines corresponds to...

...is selected, for example, to be 256.

When applying the above pulse sequence to the MR fluoroscopy as illustrated in Fig.1, a number of **navigator echoes** corresponding to shot number (N) x image picking-up number P is obtained. Each of the **navigator echoes** is expressed as V (kx, pn), wherein kx represents data point number in the readout direction and satisfies the inequation 1 ≤ kx ≤ KX, and pn represents a **navigator echo** obtained at nth shot in pth image picking-up and satisfies the inequations 1 ≤ p ≤ P and 1 ≤ n ≤ N. Likely

...

...echo signal S obtained at nth shot in pth image picking-up is expressed as S(kx, pn, m) and of which object motion is **corrected** based on the **phase** information of the corresponding **navigator echo** V(kx, pn) (having the same pn as the echo signals).

Now, a method of correcting object motion which makes use of the thus obtained **navigator echoes**, in other words, a process of **correcting phases** of respective echo signals S(kx, pn, m) is explained.

An important feature of the MRI method according to the present invention is that a **reference navigator echo** for determining phase information for respective other **navigator echoes** is not fixed to one having a specific shot number and is successively shifted. Namely, **navigator echoes** of respective shots serve at one instance as object motion monitoring **navigator echoes** and serve at another instance as a **reference navigator echo**. In Fig.1, upper halves of the respective shots are illustrated in gray and the lower halves are in white which indicates that respective **navigator echoes** can be served as a reference as well as a monitor.

In the present embodiment, in order to reflect the position of the object to be inspected during the image picking-ups on the images to be obtained, an example is explained wherein a **navigator echo** in the oldest (most previous) shot among a group of measurements used for an image reconstruction is used as a **reference navigator echo**. In this instance a **reference navigator echo** for the first piece of image 1041 is expressed as V(kx, 11) (p=1, n=1) and based on this **reference navigator echo** object motion on the echo signals obtained in the measurements 1012(equivalent to)1014 is corrected, and further, a **reference navigator echo** for the second piece of image 1042 is expressed as V(kx, 12) (p=1, n=2). In this manner, a **reference navigator echo** is successively renewed, therefore, the reference interval for correcting object motion is renewed for every repetition time TR, in other words, for every repetitive unit correcting object motion, a method in which phase differences between a **reference navigator echo** and other object motion monitoring **navigator echoes** are directly determined and the phases of the corresponding echo signals are corrected based on the thus determined phase differences, namely, a **phase correction** method in which **phase** differences are determined by making use of data of k space of **navigator echoes** and the **phase correction** of the echo signals is performed in k space is explained hereinbelow.

Now, when assuming that a **reference navigator echo** is V(kx, 1), and respective other **navigator echoes** of which phase differences are determined with **reference** to the **reference navigator echo** are V(kx,n), the phase differences (theta) is, for example, determined through the following calculations. Although, the ordinal numbers p of image picking-ups...

...the explanation.

At first, with the following calculations, phase shift map C(kx, n) expressed by a real portion and an imaginary portion of both **navigator echo** signals, is determined. (wherein re( ) represents a real portion of a signal, im( ) represents an imaginary portion of the signal and (vertical bar) (vertical bar...

...as determined through the above calculations contain phase variations rotating around a principal value and noises. Therefore, it is preferable to apply a processing of **correcting** such **phase** variations and noises contained in the phase differences (theta) prior to using the same for the **phase correction** of the echo signal (kx, n, m).

At first, in order to remove such phase variations rotating around a principal value, the following processing is...

...for example, a linear function such as y=ax+b (wherein a and b are constants).

A real portion and an imaginary portion of a **corrected phase** shift map C'(kx, n) by making use of the phase differences (theta) of which phase variation rotating round a principle value and noise components are removed, are determined as follows ;

By making use of thus **corrected phase** shift map C'(kx, n) echo signals S(kx, n, m) are corrected, and echo signals S'(kx, n, m) of which **phase** shift are **corrected** are obtained. The **phase** shift **correction** is performed for all of echo signals S(kx, n, m) having the same kx and n as those in the **correct phase** shift map C' (kx, n) according to the following calculation.

Through reconstruction of images by making use of the thus **phase** shift **corrected** echo signals S'(kx, n, m), even if an object to be inspected moves during the time when performing a group of measurements necessary for...

...to be inspected undergoes a large motion more than one pixel.

The images are thus reconstructed with such object motion correction processing while renewing the **reference navigator echo** for every image to be reconstructed.

In the above embodiment, an example, wherein a **navigator echo** in the earliest **echo** train, in other words the oldest echo train, is used as the **reference navigator echo**, was explained. However, any **navigator echo** which was obtained in any one of four measurements used for reconstructing one piece of image can be used as the **reference navigator echo**.

Further, in the above embodiment an application of the **phase correction** method in which **phase** differences are determined by making use of data of k space of **navigator echoes** and the **phase correction** of the echo signals is performed in k space is explained. However, methods of **phase correction** using **navigator echoes** applicable to the present invention are not limited to one as applied to the above embodiment. Conventional object motion **correcting** methods in which **phase** differences are determined from **navigator echo** signals after Fourier-transformed can be applied. For example, a method, in which **navigator echoes** are Fourier-transformed, phase differences between respective Fourier-transformed **navigator echoes** are determined, and the phases of echo signals Fourier-transformed on the same axis as the Fourier-transformed **navigator echoes** are corrected in an image space, can be applied, which method consumes time because of a many number of times of the Fourier transformations, but...

...motion, therefore, is, in particular, effective for a sequence such as diffusion imaging in which even a very small motion will cause artifacts.

Further, another **phase correction** method, in which profiles are determined by Fourier-transforming **navigator echoes**, phase differences of **navigator echoes** are determined based on a correlation of the profile positional shiftings between respective Fourier-transformed **navigator echoes**, and the phases of the corresponding echo signals are corrected in k space, can be also applied.

Further, methods of MR fluoroscopy which are applicable...

...are scarcely deteriorated, can be obtained, even with a low apparent temporal resolution (2TR).

In this improved MR fluoroscopy, the generation and detection of a **navigator echo** is added for each of the measurements, and a **navigator echo** which is obtained, for example, in the earliest measurement is selected as a **reference navigator echo** for every image and the phases of the measurement data of other regions are corrected based on the **reference navigator echo**. Namely, for reconstruction of the image 51 the **navigator echo** obtained in the measurement of the region 21 is selected as the reference and the phases of measurement data of the other regions are corrected, and for the reconstruction of the image 52 the **navigator echo** obtained in the measurement of the region

23 is selected as the reference and the phases of the measurement data of other regions are corrected. In this instance, likely, the reference interval, in other words resolution of the **phase correction** is matched with the temporal resolution 2TR for the images. A **navigator echo** obtained in the earliest measurement of the necessary measurements for reconstructing one piece of image can be selected as the **reference navigator echo** as in the above embodiment. However, the present invention does not limited to the above embodiment, and, for example, the **navigator echo** obtained in the measurement of the region 22 of which measurement data are always renewed can be used as the **reference navigator echo**.

Further, when performing measurement for MR image picking-up a prescanning sequence is frequently performed prior to a real measurement, for example, so as to adjust uniformity of the static magnetic field, in such instance another **navigator echo** can be added in the prescanning sequence itself and of which added **navigator echo** can be also used as a **reference navigator echo**.

Further, in the present embodiment an EPI sequence is exemplified as the standard sequence of the MR fluoroscopy. However, the standard sequence of the MR...

...gradient echo sequence, three dimensional (3D)-EPI, echo volumer, spiral imaging, EPI type spectroscopy imaging and diffusion imaging.

Further, in the present embodiment a single **navigator echo** only in readout direction is introduced for every one shot of RF pulse. However, respective **navigator echoes** in readout direction and phase encoding direction can be introduced. Still further, an orbital **navigator echo**, which is generated by applying gradient magnetic fields of which phases are shifted by 90(degree) in two crossing directions, can be used. Thereby, phase information of a plane formed by the two axes can be corrected.

Still further, in the present embodiment a **navigator echo** having phase encoding amount of zero is used. However, in general, the phase encoding amount of the **navigator echo** is not limited to zero, if the phase encoding amount thereof is in a same condition.

Moreover, the present invention is not limited to the...

...take several modifications in view of the gist of the present invention.

According to the present invention as has been explained above, when applying a **navigation echo** method to an MR fluoroscopy, a **reference navigator echo** is successively renewed for every one of images which constitute animating images, in the MRI method for animating images the positional information of the object...

33/9/2 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015866700 **Image available**
WPI Acc No: 2004-024531/**200403**
XRPX Acc No: N04-019228
Radio frequency detector **array** assembly for magnetic resonance imaging application, has decoupling interface coupled to each detector of **array** assembly, for decoupling each of detector from remaining detectors
Patent Assignee: GENERAL ELECTRIC CO (GENE)
Inventor: LEE R F
Number of Countries: 034 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
EP 1363135	A2	20031119	EP 2003253029	A	20030515	200403	B
US 20030214301	A1	20031120	US 200263843	A	20020517	200403	
JP 2004000616	A	20040108	JP 2003138257	A	20030516	200405	
US 6727703	B2	20040427	US 200263843	A	20020517	200429	
CN 1479113	A	20040303	CN 2003123815	A	20030516	200436	

NA TAT 8/17/2004

Priority Applications (No Type Date): US 200263843 A 20020517
Abstract (Basic): **EP 1363135** A2

NOVELTY - A radio frequency (RF) detector **array** (410) has several RF detectors for acquiring radio frequency signals simultaneously from magnetic resonance imaging (MRI) system. A decoupling interface (420) coupled to each of the detector, decouples each detector from remaining detectors.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for radio frequency detector **array** elements decoupling method.

USE - For magnetic resonance imaging (MRI) applications used in medical field.

ADVANTAGE - Minimizes interference and cross talk, and adjusts the overlap between coils to achieve proper mutual reactance.

DESCRIPTION OF DRAWING(S) - The figure shows a schematic view of the radio frequency detector **array** assembly.

RF detector **array** (410)
decoupling interface (420)
pp; 20 DwgNo 4/9

33/9/3 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015854391 **Image available**
WPI Acc No: 2004-012223/**200401**
XRPX Acc No: N04-008903

Magnetic resonance imaging method for blood oxygenation level dependent fMRI, involves setting degree of under sampling based on amount of phase evolution due to magnetic susceptibility distribution of object to be examined

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG)
Inventor: BOESIGER P; JAERMANN T; PRUESSMANN K P; SCHMIDT C F; WEIGER M
Number of Countries: 103 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200396045	A1	20031120	WO 2003IB1925	A	20030508	200401	B
AU 2003224374	A1	20031111	AU 2003224374	A	20030508	200442	

NA THF 8/17/2004

Priority Applications (No Type Date): EP 200276846 A 20020513

Abstract (Basic): **WO 200396045** A1

NOVELTY - The method involves generating an echo train of successive magnetic resonance signals from an object to be examined. The signals are **received** with a degree of undersampling by a **receiver** antennae **system** having a spatial **sensitivity** profile. The degree of undersampling is set based on an amount of phase evolution due to a magnetic susceptibility distribution of the object to be examined.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) a magnetic resonance imaging **system**

(b) a computer program comprising instructions for implementing the magnetic resonance imaging method.

USE - Used for blood oxygenation level dependent frequency magnetic resonance imaging.

ADVANTAGE - The undersampling allows a relevant portion of k-space to be scanned using only a single radio frequency excitation to generate the echo train, thereby avoiding phase **navigator** gating, effectively **reducing** susceptibility artefacts and blurring, and enhancing signal to noise ratio in an optimum range of the **reduction** factor. The setting up of degree of undersampling based on the phase evolution enables the image to have a high diagnostic quality and scanning of k-space to be completed in a relatively short time.

DESCRIPTION OF DRAWING(S) - The drawing shows a comparison of a single shot EPI-DWIs acquired with **SENSE** and without **SENSE**.

pp; 24 DwgNo 1/8

33/9/4 (Item 4 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015841329 **Image available**
WPI Acc No: 2003-903533/**200382**
XRPX Acc No: N03-721412
Magnetic resonance imaging device determines examination images using slice interpolation if determined **sensitivity** distributions of **receiving** coils do not correspond with slice position of examination object
Patent Assignee: HITACHI MEDICAL CORP (HITR)
Inventor: TAKAHASHI T; TAKIZAWA M
Number of Countries: 029 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200392497	A1	20031113	WO 2003JP5103	A	20030422	200382	B

NA IAF 8/17/2004

Priority Applications (No Type Date): JP 2002129152 A 20020430
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200392497	A1	J	42	A61B-005/055	

Designated States (National): CN JP US
Designated States (Regional): AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR

Abstract (Basic): **WO 200392497** A1
NOVELTY - The device has **receiving** coils (B) using which imaging portion of target is subjected to pulse sequences, to obtain 'n' **sensitivity** images (701-703) and 'm' examination images (705). If the determined **sensitivity** distributions (707,708) of the coils do not correspond with slice position of images (705), then the images (705) are determined using slice interpolation and artifacts of the images are removed using **matrix** operation.
USE - Magnetic resonance imaging device.
ADVANTAGE - Reliable magnetic resonance imaging device with effective operation, is realized.
DESCRIPTION OF DRAWING(S) - The figure shows the operation flow of the magnetic resonance imaging device.
sensitivity images (701,703)
examination images (705)
sensitivity distributions (707,708)

33/9/5 (Item 5 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015838674 **Image available**
WPI Acc No: 2003-900878/200382
XRPX Acc No: N03-719257

Magnetic resonance image reconstruction method in medical applications, involves combining MR image generated by reconstructing set MR data, with **parallel** imaging using acceleration rate of low density sampling region

Patent Assignee: BRIGHAM & WOMENS HOSPITAL INC (BGHM); MADORE B (MADO-I)
Inventor: MADORE B
Number of Countries: 103 Number of Patents: 003

NA TAF 8/17/2004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20030206016	A1	20031106	US 2002376739	P	20020501	200382	B
			US 2003427400	A	20030501		
WO 200393854	A1	20031113	WO 2003US13468	A	20030501	200402	
AU 2003234310	A1	20031117	AU 2003234310	A	20030501	200442	

Priority Applications (No Type Date): US 2002376739 P 20020501; US 2003427400 A 20030501

Abstract (Basic): US 20030206016 A1

NOVELTY - The magnetic resonance (MR) data set is obtained by sampling pair of sampling regions. One of the region is sampled with a density higher than density of other region. The MR images corrupted by artifacts are generated by reconstructing the set MR data. The generated MR image is combined with **parallel** imaging using acceleration rate of the low density sampling region.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) magnetic resonance imaging method;

(2) article of manufacture comprising recording medium storing magnetic resonance image reconstruction program; and

(3) magnetic resonance image reconstruction apparatus.

USE - For reconstructing magnetic resonance imaging (MRI) in medical applications.

ADVANTAGE - Capable of reconstructing MR data simply, thereby avoiding possible errors resulting from solving equation.

DESCRIPTION OF DRAWING(S) - The figures show the schematic view and the block diagram of the MR imaging object and the MR imaging method.

array (110)
coils (112)
object (114)
heart (116)
cables (118)

33/9/7 (Item 7 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015214011 **Image available**
WPI Acc No: 2003-274548/**200327**
XRPX Acc No: N03-217826
Self-localizing receive coil system for magnetic resonance imaging system, has several tracking devices for indicating location and orientation of surface coil assembly during imaging
Patent Assignee: GENERAL ELECTRIC CO (GENE)
Inventor: DARROW R D; DUMOULIN C L; WATKINS R D
Number of Countries: 001 Number of Patents: 001

NA TAF 8/17/2004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6492814	**B1**	**20021210**	**US 2001683404**	**A**	**20011221**	**200327**	**B**

Priority Applications (No Type Date): US 2001683404 A 20011221
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6492814	B1		8	G01V-003/00	

Abstract (Basic): **US 6492814** B1

NOVELTY - A surface coil assembly (410) is positioned adjacent to a region to be imaged. Several tracking devices (420) are attached to the surface coil assembly for indicating location and orientation of surface coil assembly during imaging.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for surface coil assembly locating method.

USE - Self-localizing receive coil system for magnetic resonance imaging (MRI) system utilizing simultaneous acquisition of spatial harmonics (SMASH) and sensitivity encoding imaging procedures.

ADVANTAGE - The tracking devices provide three-dimensional location and orientation more quickly and accurately while eliminating MR signal shading and large **field** of **view** aliasing.

DESCRIPTION OF DRAWING(S) - The figure shows the schematic diagram of the self-localizing receive coil system.

surface coil assembly (410)
tracking devices (420)

33/9/8 (Item 8 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015148957 **Image available**
WPI Acc No: 2003-209484/200320
XRPX Acc No: N03-166995
Nuclear magnetic resonance imaging method for medical application, involves computing **sensitivity matrix** from coil **sensitivity** image data acquired from local coils adjacent to target
Patent Assignee: KING K F (KING-I); GE MEDICAL SYSTEMS GLOBAL TECHNOLOGY CO (GENE)
Inventor: KING K F
Number of Countries: 001 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020171422	A1	20021121	US 2001851775	A	20010509	200320	B
US 6559642	**B2**	**20030506**	**US 2001851775**	**A**	**20010509**	**200338**	

Priority Applications (No Type Date): US 2001851775 A 20010509
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020171422	A1		9	G01V-003/00	
US 6559642	B2			G01V-003/00	

Abstract (Basic): US 20020171422 A1

NOVELTY - Calibration data and image data are acquired from N local coils positioned near the patient anatomy, using a pulse train. A coil **sensitivity** image for each coil is calculated using the calibration images which are reconstructed with the calibration data. A **sensitivity matrix** (S) is formed from the coil **sensitivity** images. A proton distribution image is formed based on the **sensitivity matrix** and an image that is reconstructed from the image data.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for **sensitivity matrix** formation method.

USE - For acquiring nuclear magnetic resonance imaging (MRI) data using **sensitivity** encoding (**SENSE**) technique, in medical applications.

ADVANTAGE - By using the **sensitivity matrix** in a **sensitivity** encoding technique, to reconstruct the MR image acquired with the local coils, the image reconstruction time is **reduced**.

DESCRIPTION OF DRAWING(S) - The figure shows the flowchart explaining the magnetic resonance imaging process.

Same type as known Prior Art Sets of the problem Applicant desires to Solve. Does not Have Parallel Receivers and Sensitivity Matrix with a Navigator echo
JAF 8/17/2004

33/9/9 (Item 9 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015107149 **Image available**
WPI Acc No: 2003-167668/**200316**
XRPX Acc No: N03-132424
Processing method for magnetic resonance imaging signals from several imaging coils for creating composite medical images from individual signals **receiving** signals and calculating composite pixel value for a location
Patent Assignee: MRI DEVICES CORP (MRID-N); DUENSING G R (DUEN-I); KING S B (KING-I); VAROSI S (VARO-I)
Inventor: DUENSING G R; KING S B; VAROSI S
Number of Countries: 101 Number of Patents: 004

NA TAF 8/17/2004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200303037	A2	20030109	WO 2002US19275	A	20020618	200316	B
US 20030038632	A1	20030227	US 2001299012	P	20010618	200318	
			US 2002174843	A	20020618		
EP 1412769	A2	20040428	EP 2002756225	A	20020618	200429	
			WO 2002US19275	A	20020618		
AU 2002322248	A1	20030303	AU 2002322248	A	20020618	200452	

Priority Applications (No Type Date): US 2001299012 P 20010618; US 2002174843 A 20020618
Abstract (Basic): WO 2003003037 A2

NOVELTY - The method involves determining a noise covariance **matrix**, N, of several magnetic resonance imaging coils. Corresponding signal s=(s1, s2,s3,sn) are **received** from the coils. The signals represent corresponding pixel values for a location. A composite pixel value is calculated for the location using a formula.

USE - For creating composite medical images from individual signals.

ADVANTAGE - Improved processing of electrical signals.

DESCRIPTION OF DRAWING(S) - The figure shows the invention.

pp; 17 DwgNo 2/4

Title Terms: PROCESS; METHOD; MAGNETIC; RESONANCE; IMAGE; SIGNAL; IMAGE; COIL; COMPOSITE; MEDICAL; IMAGE; INDIVIDUAL; SIGNAL; **RECEIVE**; SIGNAL; CALCULATE; COMPOSITE; PIXEL; VALUE; LOCATE
Derwent Class: S01; S03; S05; T01
International Patent Class (Main): G01R-033/20; G01R-033/3415; G01V-003/00
File Segment: EPI
Manual Codes (EPI/S-X): S01-E02A2A; S01-E02A8C; S03-E07A; S05-D02B2; T01-J06A; T01-J10B; T01-J10C7

33/9/10 (Item 10 from file: 350)
DIALOG(R)File 350:Derwent WPIX

015031218 **Image available**
WPI Acc No: 2003-091735/200308
XRPX Acc No: N03-072670
UNFOLD and magnetic resonance technique combination method for cardiac imaging system, involves separating overlapped aliased and non-aliased components of image for different frequencies and image pixels using **parallel** imaging technique
Patent Assignee: BRIGHAM & WOMENS HOSPITAL INC (BGHM); MADORE B (MADO-I)
Inventor: MADORE B
Number of Countries: 023 Number of Patents: 004
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020153890	A1	20021024	US 2001285399	P	20010420	200308	B
			US 2002125984	A	20020419		
WO 200286517	A2	20021031	WO 2002US12661	A	20020422	200308	
US 6714010	B2	20040330	US 2001285399	P	20010420	200423	
			US 2002125984	A	20020419		
AU 2002256312	A1	20021105	AU 2002256312	A	20020422	200433	

NA TMF 8/17/2004

Priority Applications (No Type Date): US 2001285399 P 20010420; US 2002125984 A 20020419
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020153890	A1		9	G01V-003/00	Provisional application US 2001285399
WO 200286517	A2	E		G01R-000/00	

Designated States (National): AU CA JP
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 6714010	B2			G01V-003/00	Provisional application US 2001285399
AU 2002256312	A1			G01V-003/00	Based on patent WO 200286517

Abstract (Basic): US 20020153890 A1
NOVELTY - The K-space information about an object is obtained at a pair of time points and a set of K-space locations. The information for images containing spatially aliased and non-aliased components and image pixels, are obtained by using the K-space information. The overlapped aliased and the non-aliased components are separated using a **parallel** imaging technique for different frequencies and image pixels, repeatedly.
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for article of manufacture comprising recorded medium storing UNFOLD and magnetic resonance techniques combining program.
USE - For combining UNFOLD technique with **parallel** magnetic resonance (MR) technique such as SMASH, SENSE, SPACE-RIP, etc., used for MR cardiac imaging system.
ADVANTAGE - By combining the MRI technique with UNFOLD technique, higher acceleration is obtained.
DESCRIPTION OF DRAWING(S) - The figures show the diagram and flowchart explaining UNFOLD acquisition technique and UNFOLD with **parallel** magnetic imaging technique combining process.
pp; 9 DwgNo 1B, 4/7
Title Terms: UNFOLD; MAGNETIC; RESONANCE; TECHNIQUE; COMBINATION; METHOD; CARDIAC; IMAGE; SYSTEM; SEPARATE; OVERLAP; NON; COMPONENT; IMAGE; FREQUENCY; IMAGE; PIXEL; **PARALLEL**; IMAGE; TECHNIQUE
Derwent Class: S01; S03; S05; T01
International Patent Class (Main): G01R-000/00; G01V-003/00
File Segment: EPI
Manual Codes (EPI/S-X): S01-E02A2; S01-E02A8C; S03-E07A; S05-D02B; T01-J06A ; T01-J10B; T01-S03

33/9/11 (Item 11 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014914454 **Image available**
WPI Acc No: 2002-735161/**200280**
XRPX Acc No: N02-579605

Magnetic resonance imaging apparatus has comparator that differentiates unfolded representations of various modification data with sensitivity profile representations

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); MARCONI MEDICAL SYSTEMS UK LTD (MAON); BYDDER M (BYDD-I); HAJNAL J V (HAJN-I); LARKMAN D J (LARK-I); PHILIPS MEDICAL SYSTEMS INC (PHIG)
Inventor: BYDDER M; HAJNAL J V; LARKMAN D J
Number of Countries: 032 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
GB 2374673	A	20021023	GB 20019791	A	20010420	200280	B
WO 200301227	A2	20030103	WO 2002US12523	A	20020419	200303	
US 20030025499	A1	20030206	US 2002126707	A	20020419	200313	
US 6593741	B2	20030715	US 2002126707	A	20020419	200348	
EP 1391744	A1	20040225	EP 200278214	A	20020805	200415	N

NA THF 8/17/2004

Priority Applications (No Type Date): GB 20019791 A 20010420; EP 200278214 A 20020805
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
GB 2374673	A		28	G01R-033/56	
WO 200301227	A2	E		G01R-033/20	

Designated States (National): JP
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20030025499	A1			G01V-003/00	
US 6593741	B2			G01V-003/00	
EP 1391744	A1	E		G01R-033/3415	

Designated States (Regional): AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI SK TR

Abstract (Basic): **GB 2374673** A

NOVELTY - A comparator differentiates unfolded representations of various modification data with sensitivity profile representations to select an unfolded representation according to a predetermined criterion. This criterion may be a predetermined peak in the probability distribution of intensity of the unfolded images or the minimum entropy of the unfolded images.

USE - Magnetic resonance imaging apparatus.

ADVANTAGE - Shortens data collection time during imaging. Unfolds data by **parallel** imaging. Ensures fast magnetic resonance imaging.

DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of a magnetic resonance imaging apparatus.

pp; 28 DwgNo 6/15

Title Terms: MAGNETIC; RESONANCE; IMAGE; APPARATUS; COMPARATOR; DIFFERENTIAL; UNFOLD; REPRESENT; VARIOUS; MODIFIED; DATA; SENSITIVE; PROFILE; REPRESENT
Derwent Class: S01; S03
International Patent Class (Main): G01R-033/20; G01R-033/3415; G01R-033/56; G01V-003/00
International Patent Class (Additional): G01R-033/54
File Segment: EPI
Manual Codes (EPI/S-X): S01-E02A2; S01-E02A8C; S03-E07A

33/9/12 (Item 12 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014871431 **Image available**
WPI Acc No: 2002-692137/**200274**
XRPX Acc No: N02-546029
Canceling ghost artifacts in magnetic resonance imaging by using time-varied phase encode order to calculate lower resolution image without artifacts
Patent Assignee: US DEPT HEALTH & HUMAN SERVICES (USSH); US GOVERNMENT (USGO)
Inventor: KELLMAN P; MCVEIGH E R; MCVEIGH E
Number of Countries: 100 Number of Patents: 004

NA TAF 8/17/2004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200282114	A1	20021017	WO 2002US9939	A	20020328	200274	B
US 20020167315	A1	20021114	US 2001825617	A	20010403	200277	
AU 2002247451	A1	20021021	AU 2002247451	A	20020328	200433	
US 6771067	B2	20040803	US 2001825617	A	20010403	200451	

Priority Applications (No Type Date): US 2001825617 A 20010403
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200282114	A1	E	35	G01R-033/3415	

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020167315	A1			G01V-003/00	
AU 2002247451	A1			G01R-033/3415	Based on patent WO 200282114
US 6771067	B2			G01V-003/00	

Abstract (Basic): **WO 200282114** A1
NOVELTY - Method consists in acquiring data using an **array** of **receiver** coils in a magnetic resonance environment and a phase encode order in which k-space distortion has components which are periodic. The data is converted to the image domain by fast Fourier transform to produce images with ghost artifacts and these are cancelled using phased **array** ghost cancellation processing which includes passing the images with the ghost artifacts through phased **array** combiners coupled in **parallel**. The phase encode order is designed so that the k-space distortion has a rapid periodic variation and a temporal filter is coupled in series with the phased **array** ghost cancellation processing to further suppress the ghost artifacts.
DETAILED DESCRIPTION - There is an INDEPENDENT CLAIM for a **system** for canceling ghost artifacts in magnetic resonance imaging.
USE - Method is for canceling ghost artifacts in MRI imaging caused by e.g. multi-shot EPI with non-interleaved phase encode acquisition.
ADVANTAGE - Method **reduces** blur and geometric distortion, eliminates echo shifting and **reduces sensitivity** to flow.
DESCRIPTION OF DRAWING(S) - The figure shows a device for canceling a single ghost artifact where the superimposed desired and ghost images are separated by phased **array** combination and recombined after the appropriate position alignment (shift).
pp; 35 DwgNo 4/9
Title Terms: GHOST; ARTIFACT; MAGNETIC; RESONANCE; IMAGE; TIME; VARY; PHASE ; ENCODE; ORDER; CALCULATE; LOWER; RESOLUTION; IMAGE; ARTIFACT
Derwent Class: S01; S03; T01
International Patent Class (Main): G01R-033/3415; G01V-003/00

33/9/13 (Item 13 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014419152 **Image available**
WPI Acc No: 2002-239855/**200229**
XRPX Acc No: N02-185024

Method for forming magnetic resonance image, **receives** signals over plural channels, with noise correlation represented by **matrix**, and each individual antenna having its own **sensitivity** profile

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS CORP INTELLECTUAL PROPERTY GMBH (PHIG); BORNERT P (BORN-I); PRUSSMANN K P (PRUS-I); WEIGER M (WEIG-I)
Inventor: BOERNERT P; PRUESSMANN K P; WEIGER M; BORNERT P; PRUSSMANN K P

NA TAF 8/17/2004

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200173463	A1	20011004	WO 2001EP3008	A	20010319	200229	B
US 20020014889	A1	20020207	US 2001814391	A	20010321	200229	
EP 1212633	A1	20020612	EP 2001915361	A	20010319	200239	
CN 1380983	A	20021120	CN 2001801406	A	20010319	200319	
US 6545472	B2	20030408	US 2001814391	A	20010321	200327	
JP 2003528666	W	20030930	JP 2001571125	A	20010319	200365	

Priority Applications (No Type Date): EP 2000201065 A 20000324

Abstract (Basic): **WO 200173463** A1

NOVELTY - The inventive method enables the reconstruction of a magnetic resonance image (MRI) from signals **received** over plural channels, each channel being input from a surface coil **receiving** antenna. The signals are acquired by sub-sampling the k-space in e.g. a patient anatomical area requiring diagnosis. Signal re-sampling over a regular square grid is carried out, from which Fast Fourier Transformation is applied to the signals, enabling reconstruction of a MRI.

DETAILED DESCRIPTION - The image is developed on the basis of **receiving** antenna spatial **sensitivity** profiles, so that contributions from different spatial positions in the sub-sampled signals may be separated. The k-space sampling is preferably carried out by following a spiral-shaped trajectory.

INDEPENDENT CLAIMS are included for:

(1) An MRI **system**;

(2) using a computer program loaded from a carrier e.g. CD-ROM or via a network such as the WWW.

USE - For acquiring MRI signals at significantly faster rate than possible with prior art **SENSE** technique method.

ADVANTAGE - Enables high degree of freedom in choosing k-space acquisition trajectory, e.g. respective parts of k-space may be traversed at different speeds, preferably following a spiral-shaped trajectory, particularly suitable for use in magnetic resonance angiography, with sub-sampling acquisition of MRI signals and k-space scanning along a spiral-shaped trajectory enabling fast acquisition of images of a patient's arterial vascular **system**, with high spatial resolution.

DESCRIPTION OF DRAWING(S) - The drawing illustrates schematically a MRI **system** in accordance with the invention.

Principal resonance coils, enclosing tunnel-shaped examination space (10)

Gradient coils (11,12)
Transmission/body coil (13)
Transmit/**receive** circuit (15)
Surface coils (16)
Control unit (20)
Power supply unit (21)
Modulator (22)
Pre-amplifier (23)
Demodulator (24)
Digital image processing/reconstruction unit (25)
Monitor (26)
Buffer unit (27)

33/9/14 (Item 14 from file: 350)
DIALOG(R)File 350:Derwent WPIX

NA TAF 8/17/2004

014406390 **Image available**
WPI Acc No: 2002-227093/**200228**
Related WPI Acc No: 2002-164854; 2002-217133
XRPX Acc No: N02-174304
Magnetic resonance method for forming a fast dynamic image from signals acquired by an **array** of multiple **sensors** segmenting k-space into regions of different type of acquisition
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); FUDERER M (FUDE-I) ; HARVEY P R (HARV-I)
Inventor: FUDERER M; HARVEY P R
Number of Countries: 028 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200210788	A1	20020207	WO 2001EP8121	A	20010713	200228	B
US 20020060567	A1	20020523	US 2001918159	A	20010730	200239	
US 6448771	B1	20020910	US 2001918159	A	20010730	200263	
EP 1307758	A1	20030507	EP 2001960498	A	20010713	200332	
			WO 2001EP8121	A	20010713		
JP 2004504908	W	20040219	WO 2001EP8121	A	20010713	200414	
			JP 2002516663	A	20010713		

Priority Applications (No Type Date): EP 2000204810 A 20001222; EP 2000202728 A 20000731
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200210788	A1	E	21	G01R-033/561	

Designated States (National): JP
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020060567	A1			G01V-003/00	
US 6448771	B1			G01V-003/00	
EP 1307758	A1	E		G01R-033/561	Based on patent WO 200210788

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 2004504908	W		33	A61B-005/055	Based on patent WO 200210788

Abstract (Basic): **WO 200210788** A1

NOVELTY - The method involves at least two adjacent **sensors** recording signals originating from the same imaging position. The signals are weighted with the **sensitivity** factor of the respective **sensor** at the respective imaging position. The image intensity is calculated from the signals measured by the different **sensors**. The number of phase encoding steps is **reduced** w.r.t the full set.

k-space is segmented into regions of different acquisition

DETAILED DESCRIPTION - In the region of a first acquisition type there is acquired data of normal magnetic resonance imaging with a full set of phase encoding steps, or data of fast dynamic imaging with a number of phase encoding steps with a low **reduction** factor w.r.t to the full set.

INDEPENDENT CLAIMS are included for a magnetic resonance imaging **apparatus** and for a computer program product.

USE - For forming a fast dynamic image from signals acquired by an **array** of multiple **sensors**.

ADVANTAGE - Achieves major **reduction** of the noise level across the entire image during fast dynamic imaging.

DESCRIPTION OF DRAWING(S) - The figure shows the acquisition scheme of the invention.

pp; 21 DwgNo 3/8

Title Terms: MAGNETIC; RESONANCE; METHOD; FORMING; FAST; DYNAMIC; IMAGE;

33/9/15 (Item 15 from file: 350)
DIALOG(R)File 350:Derwent WPIX

NA TAF 8/17/2004

014396430 **Image available**
WPI Acc No: 2002-217133/**200227**
Related WPI Acc No: 2002-164854; 2002-227093
XRPX Acc No: N02-166383
Magnetic resonance imaging method using acquisition of sub-sampled magnetic resonance signal with a **system** of receiver antennae, reconstruction of a magnetic resonance image and optimization of the reconstruction
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS CORP INTELLECTUAL PROPERTY GMBH (PHIG); FUDERER M (FUDE-I); JURRISSEN M P J (JURR-I); KATSCHER U (KATS-I); VAN DEN BRINK J S (VBRI-I); VAN MUISWINKEL A M C (VMUI-I)
Inventor: FUDERER M; JURRISSEN M P J; KATSCHER U; VAN DEN BRINK J S; VAN MUISWINKEL A M C
Number of Countries: 028 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 200210787	A1	20020207	WO 2001EP8120	A	20010713	200227	B
US 20020039024	A1	20020404	US 2001918160	A	20010730	200227	
US 6518760	B2	20030211	US 2001918160	A	20010730	200314	
EP 1307757	A1	20030507	EP 2001960497	A	20010713	200332	
			WO 2001EP8120	A	20010713		
JP 2004504907	W	20040219	WO 2001EP8120	A	20010713	200414	
			JP 2002516662	A	20010713		

Priority Applications (No Type Date): EP 2000203285 A 20000921; EP 2000202728 A 20000731
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200210787	A1	E	23	G01R-033/561	

Designated States (National): JP
Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020039024	A1			G01V-003/00	
US 6518760	B2			G01V-003/00	
EP 1307757	A1	E		G01R-033/561	Based on patent WO 200210787

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 2004504907	W		36	A61B-005/055	Based on patent WO 200210787

Abstract (Basic): **WO 200210787** A1

NOVELTY - The method involves acquisition of sub-sampled magnetic resonance signals with a **system** of receiver antennae. The **system** of receiver antennae have a spatial **sensitivity** profile. A magnetic resonance image is reconstructed on the basis of the sub-sampled magnetic resonance signal, the spatial **sensitivity** profile and a priori image information.

The reconstruction is optimized w.r.t a pre-selected aspect of distribution of sampled data included in the sub-sampled magnetic resonance signals over the reconstructed magnetic resonance image. The a priori information is taken into account as a constraint in the optimization

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for a magnetic resonance imaging **system** and for a computer program comprising instructions.

USE - None given.

ADVANTAGE - Artefacts are more effectively avoided in the magnetic resonance image reconstructed from the sub-sampled magnetic resonance signals.

DESCRIPTION OF DRAWING(S) - The figure shows a magnetic resonance imaging **system**.

Main magnet coils (10)

Gradient coils. (11,12)

WEST Search History

Hide Items | Restore | Clear | Cancel

DATE: Tuesday, August 17, 2004

Hide?	Set Name	Query	Hit Count
		DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ	
☐	L31	L30 and (navigat$4)	0
☐	L30	(20030001571 or 20020167315 or 20030004408 or 20030004410)	8
☐	L29	L28 and (phase or phasing or phased)	12
☐	L28	L27 and ((intermediat$3 or middle or secondary or second or weight$4 or another or additional) with imag$4)	13
☐	L27	L26 and (imag$4)	17
☐	L26	L25 and (correct$4 or compensat$4 or adjust$4 or control$4)	17
☐	L25	L24 and (sensor or senser or detect$4 or receiv$4 or reception)	17
☐	L24	L23 and (sensitiv$4)	17
☐	L23	L2 and ((reduced or partial$2 or limit$3 or restrict$3 or reduction or incomplet$3 or undersampl$3 or under-sampl$3 or "under sampl$3") with (field-of-view or FOV or "field of view" or region-of-interest or ROI or "region of interest" or "region of investigation" or region-of-investigation))	23
☐	L22	L21 and (navigat$4)	15
☐	L21	L14 or L16 or L19	106
☐	L20	L19 and (navigat$4)	0
☐	L19	6512372	5
☐	L18	L16 and (navigat$4)	9
☐	L17	L14 and (navigat$4)	6
☐	L16	(6741880 or 6408201 or 6178346)	33
☐	L15	L14 and (navigat$4)	6
☐	L14	(6492814 or 6489764 or 6487435 or 6486,671 or 6377045 or 6559642 or 6564082 or 6289232 or 5910728)	69
☐	L13	L12 and (full$2 or entire$2 or complet$3)	8
☐	L12	L11 and ((intermediat$3 or middle or secondary or second or weight$4 or another or additional) with imag$4)	8
☐	L11	L10 and (imag$4)	8
☐	L10	L9 and (correct$4 or compensat$4 or adjust$4 or control$4)	8
☐	L9	L8 and (phase)	8
☐	L8	L7 and (sensor or senser or detect$4 or receiv$4 or reception)	11
☐	L7	L6 and (sensitiv$4)	11
		L5 and ((reduced or partial$2 or limit$3 or restrict$3 or reduction or	

☐	L6	incomplet$3 or undersampl$3 or under-sampl$3 or "under sampl$3") with (field-of-view or FOV or "field of view" or region-of-interest or ROI or "region of interest" or "region of investigation" or region-of-investigation))	17
☐	L5	L4 and (field-of-view or FOV or "field of view" or region-of-interest or ROI or "region of interest" or "region of investigation" or region-of-investigation)	109
☐	L4	L3 and (reduced or partial$2 or limit$3 or restrict$3 or reduction or incomplete or undersampl$3 or under-sampl$3 or "under sampl$3")	949
☐	L3	L2 and (matrix or array)	970
☐	L2	L1 and (navigat$4)	1763
☐	L1	((magnetic adj resonance) or MRI or NMR)	185246

END OF SEARCH HISTORY